SBN Far Detector Building Hazard Awareness Training Handout

Version 2.7
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Overview

The installation and commissioning phases of the ICARUS experiment presents many potential hazards. This document is intended to inform you of the potential hazards you may encounter in the SBN-FD building and the proper precautions to take to reduce risks. Please read the entire document, then either take the online test, or sign and submit the signature sheet at the end. Contact the Facility Manager to be added to the SBN-FD access list. As new phases are entered, updated versions of this document will be released, and retraining will be required.

1 Introduction

This training document outlines the hazards specific to the SBN-FD building.

All personnel are required to immediately stop any activity that poses an imminent danger to personnel or the environment, and notify their supervisor/point-of-contact and the Neutrino Division (ND) Division Safety Officer (DSO), Angela Aparicio (x3701, asands@fnal.gov or exp_dso@fnal.gov).

All personnel (employees, users, subcontractors) on the Fermilab site are to follow the safety, health and environmental requirements outlined in the Fermilab Environment, Safety and Health Manual (FESHM) and the Fermilab trainings presented to them. If there is a point where you have a professional difference of opinion regarding a requirement, you may make an appeal with the Chief Safety Officer (CSO) and Division Head. The DSO's interpretation of the rule is to be implemented while awaiting review by the CSO/Division Head.

In the event of an emergency, you should call extension 3131 from any Fermilab telephone.

Environment, Safety and Health (ES&H) materials referenced in this document can be consulted for guidance on ES&H issues. These materials can be found on-line at this URL: http://eshq.fnal.gov/atwork/

2 Work Planning and Coordination

Prior to initiating new work at SBN-FD you must notify the Experiment Liaison Officer (ELO), Carrie McGivern (x6337, mcgivern@fnal.gov). Depending on the scale, complexity, and associated safety hazards you may be asked to make a small presentation at the weekly ICARUS Technical Working Group Meeting. The appropriate ES&H documentation, such as written hazard analyses, and sign-offs will be required prior to starting any new work. See the SBN Far Detector Installation page for more information.

ES&H oversight is provided by the ND DSO, Angela Aparicio (x3701, asands@fnal.gov). Issues of building maintenance should be directed to the SBN-FD Building Manager, Harry Ferguson (x2450, ferguson@fnal.gov).

3 Personal Protective Equipment (PPE)

All personnel entering the SBN-FD building must wear sturdy, closed-toe shoes, at a minimum, during all phases of installation.

The use of the building cranes presents an overhead hazard. There is also a hazard from items dropped by others working above you. For personnel entering the lowest ("pit") level of the building, hard hats are always to be worn while working on this level. Hard hats are required for personnel working on top of the warm vessel and on the cryogenics platform at the north end of the mezzanine level. Hard hats are staged on a bookshelf on the mezzanine level near the stairs to the top of the warm vessel.

The building loading dock will be cordoned off during craning activities with signage that indicates hard hats are to be worn in that area. It is the responsibility of the crane operator to ensure the area is cordoned off before starting crane operation.

Additional PPE required for specific installation activities will be determined based on the hazards of the specific tasks and must be described in the associated written job hazard analyses.

4 Cryogenic Hazards

During commissioning and operations, liquid argon and liquid nitrogen will be present in the building in large quantities contained inside cryogenic equipment (e.g. vessels or piping). The cryogens are inert (argon or nitrogen) and upon release to atmosphere present a risk of asphyxiation and/or thermal burns. While only cryogenic personnel shall operate cold cryogenic equipment, everyone who enters an Oxygen Deficiency Hazard (ODH) area could be exposed to the hazard of asphyxiation (oxygen deficiency hazard). The SBN Far Detector building ODH analysis has determined that the grade level (main floor) is an ODH-0 area. This means that additional training beyond this course will not be required to access the building at grade level.

To access ODH-1 areas (including the mezzanine, top of the warm vessel, and the pit), you must meet the following:

- Complete the O.D.H Training [FN000029] and remain current in your training (requalification required every 12 months).
- Pass the ODH medical exam (requalification required every 24 months).
- Access with another trained and medically qualified person (2-person rule).
- Carry an oxygen monitor, available in the west stairwell. Ensure a fresh air calibration is done prior to entering the ODH-1 area(s).
- Carry an oxygen pack when working in areas that may take longer to escape (e.g. work on the warm vessel roof, or in the pipe chase).

Upon leaving the ODH-1 area, return your oxygen monitor (and oxygen pack, when applicable).

In the event of a leak (which may show as a persistent fog), all personnel within the building must exit immediately (gather in the parking lot near the emergency generator), and the cryogenics support group must be informed of the problem. The ODH alarms in the building will sound when oxygen levels drop below 19.5%. If you hear a whooper alarm or see the ODH alarm strobes flashing, exit the building (gather in the parking lot next to the emergency generator) and await an all clear from the Fermilab Fire Department or the cryogenics support group. **The cryogenics support group can be reached at (630)981-4157.**

Additional information regarding the controls and procedures required of cryogenic and ODH areas are contained in FESHM 5032 Cryogenic System Review and FESHM 4240 Oxygen Deficiency Hazards (ODH) (Work Smart Standard).

Personnel who may work on any of the pressurized systems within SBN-FD must complete Pressure Safety Orientation [FN000271] Training. If personnel will need to work on systems that may contain stored hazardous energy (e.g. pressurized gas, electricity, etc.), Lockout/Tagout Level 2 training [FN000212] will be required. The use of configuration control locks does not require Lockout/Tagout Level 2 training. Configuration control guidance is provided in FESHM Chapter 2100: Fermilab Energy Control Program.

Personnel handling compressed gas cylinders (e.g. connecting/disconnecting, transporting) must complete Compressed Gas Cylinder Safety [FN000213] Training.

5 Electrical Hazards at SBN-FD Facility

5.1 Impedance Monitoring System

The Impedance Monitoring System monitors the 'isolation' between the building and detector grounds. When a direct connection is made between the two grounds, a visual flashing warning beacon and audible alarm is activated. The audible alarm sound is a gong sound.

There are many locations within the facility where detector and building grounded conductive materials come within close proximity to each other. These areas are identified with pink ribbon on the detector grounded items.

In the event that the warning beacon and audible alarm are activated, all workers should stop and see if something they have done has caused the short. If assistance is required, notify the SBN AC Electrical Coordinator (x3100, bagby@fnal.gov). Workers will be asked of their exact location and what they were doing when the alarm was activated.

6 Hazardous Materials at the SBN-FD Facility

Any cutting, coring/drilling of concrete requires ESH review of the work. Contact the ND DSO. Depending on the type and amount of work, controls such as a HEPA vacuum or respiratory protection may be required. See the Fermilab Silica Guidance Table for more information.

7 Emergencies

Call ext. 3131 from a lab phone (630-840-3131 from a cell phone) in the event of an emergency, such as personnel requiring medical treatment for any reason. Stay on the phone until the emergency operator indicates that s/he has all the necessary information, including your name, location and nature of the emergency.

7.1 Steady Alarm (Fire Alarm)

Exit via the closest exit door; gather at the emergency assembly area, located in the SBN-FD parking lot.

7.2 Whooper Alarm (ODH Alarm)

Exit via the closest exit door; gather at the emergency assembly area, located in the SBN-FD parking lot.

7.3 Sitewide Emergency Warning System (SEWS)

This is a verbal communication system broadcast throughout all areas of the laboratory. It is used to notify personnel when hazardous conditions exist and what protective actions to take. It is very important that you respond to its warning tones and messages and that you follow the transmitted instructions. If the nature of the message indicates severe weather (e.g. a tornado), promptly go to the designated shelter for your area.

The designated shelter areas are either of the stairwells. Proceed to the mezzanine levels of the stairwell. Remain in the shelter until given directions via the safety alert monitor that it is safe to exit.

8 Hazards Associated with Working at Heights at SBN-FD

Hard hats are required whenever working in an area where personnel lifts (such as aerial or scissor lifts) are in use, or in locations where work is occurring overhead. Fall protection is required when working in aerial lifts (boom or articulating).

Any ladder use on the surface or mezzanine levels where the ladder is placed within a ladder-height distance from any guardrail requires the use of fall protection equipment. Some unloading activities on the loading dock may expose personnel to a fall hazard that will require the use of fall protection equipment to mitigate. If an anchor point is not already established, contact the ND DSO for assistance.

Only individuals who have completed Fall Protection Orientation [FN000304] Training may use fall protection equipment. Any use of personal fall protection equipment will require a written hazard analysis and rescue plan.

9 Confined Spaces and Limited Access Areas at SBN-FD Facility

The sump pump pit and pipe chase are confined spaces that require a confined space entry permit. Do not enter unless you have a completed entry permit and up-to-date Confined Spaces training. Contact the ND DSO or the ES&H Section Industrial Hygiene Group for entry permit approval.

10 Equipment that requires additional training to operate

The following equipment requires additional training to be completed prior to operating this equipment:

- Aerial lifts – must complete the classroom Aerial Lift Training and one or both evaluation courses:
  - Vertical lifts
  - Extended boom lifts
- Tech shop equipment, such as the drill press, band saws or shears in the NOvA building.
- Cranes and hoists, which includes on-the-job training and an evaluation
- Forklifts, which will also include on-the-job training and an evaluation

Please see the ELO or DSO to arrange for training.

11 Radioactive Sources

The SBN-FD building is posted as a Controlled Area, which requires every entrant to have GERT training or be escorted by a GERT or Rad Worker trained individual.

Only personnel who have current Rad Worker Training (Radiological Worker – Classroom [FN000470] and Radiological Worker – Practical Factors [FN000471]) and Radioactive Source Training [FN000048] can sign out radioactive sources from the designated “source monitor.” The names of the source monitors for SBN-FD are posted on the radioactive source storage box.

12 Miscellaneous

The following describes some additional general hazards and work rules which exist within the facility:

- Smoking is permitted outdoors only and at least 15 feet away from entrances.

- All new visitors working at Fermilab must register with the Users' Office (Wilson Hall Mezzanine, ext. 3111) upon their arrival.
- It is always preferred that people not work alone. When this is impractical, workers should at least ensure that another person, such as their supervisor, is aware of when and where they are working, and they should make arrangements to periodically check-in with that person. This is especially important for work during off-hours. Also note that for some types of jobs, a "two-man" rule may exist. Consult with your supervisor, Fermilab point-of-contact, or DSO.
- Tour rules:
    - Notify the Experiment Liaison Officer (ELO) of tours in the Far Detector building at least 2 hours in advance. Please copy the following on your tour notice to the ELO: Cat James, Peter Wilson, Angela Fava, and Angela Aparicio (see contact list below for email addresses).
        - Tour groups are expected to remain on the West and South ground floor areas ("main" floor) of the building. Tour groups should not go onto the loading dock or east side of the building, as these are work areas.
        - Tour groups are limited to a maximum of 10 people.
        - Tourists must be 18 years of age or older.
    - Tour groups in excess of 10 people, containing any minors, or requesting access to other areas of the building (e.g. mezzanine/warm vessel or lower/pit level) require prior approval through the ELO.

12 SBN-FD Contacts

Building Manager	Harry Ferguson	x2450, ferguson@fnal.gov
Experiment Liaison Officer/Facility Manager	Carrie McGivern	x6337, mcgivern@fnal.gov
SBN Program Manager	Peter Wilson	x2156, pjw@fnal.gov
SBN Deputy Program Manager	Cat James	x2287, cjames@fnal.gov
SBN Program Engineer	Barry Norris	x3672, norris@fnal.gov
SBN Program Electrical Coordinator	Linda Bagby	x3100, bagby@fnal.gov
SBN-FD Cryo Project Engineer	Michael Geynisman	x2191, hope@fnal.gov
Cryogenics Support Group		(630)981-4157
ICARUS Technical Coordinator	Claudio Montanari	x2408, cmontana@fnal.gov
ICARUS Deputy Technical Coordinator	Angela Fava	x2188, afava@fnal.gov
Division Safety Officer/SBN ORC Chair	Angela Aparicio	x3701, asands@fnal.gov
Radiation Safety Officer	Nino Chelidze	x2995, chelidze@fnal.gov

13 SBN-FD Building Hazard Awareness Quiz

Name: _____ ID#: _____ Date: _____

1) What actions should you take if you hear the tornado sirens?
   a) Stay on the main level of the building
   b) Take shelter in one of the stairwells
   c) Get in your vehicle and drive home
   d) Step outside to look for signs of tornadoes

2) What actions should you take if you hear a fire alarm?
   a) Take shelter in one of the stairwells
   b) Investigate if there really is a fire
   c) Evacuate the building and gather in the SBN-FD parking lot
   d) Get in your vehicle and go home

3) Approval to begin a job/task at the SBN-FD building must be received from:
   a) SBN Program Coordinator
   b) SBN ESH Coordinator
   c) Fermilab Fire Department
   d) SBN-FD Installation Manager
   e) Experiment Liaison Officer

4) What actions should you take if you hear the impedance monitor alarm?
   a) Call extension 3131
   b) Call the Main Control Room
   c) Call the SBN Electrical Coordinator
   d) Leave the building immediately

5) What should you do in the event any person requires medical treatment?
   a) Panic
   b) Call extension 3131
   c) Call the installation manager
   d) Call the Main Control Room
   e) Treat the person with a first aid kit

6) Sandals and other open-toe footwear may be worn in the SBN-FD building if you are not doing work.
   a) True
   b) False

7) When/where are hard hats required to be worn at the SBN-FD building?
   a) When on the loading dock when either building crane is in operation
   b) When on the warm vessel
   c) When in the lowest level (pit)
   d) All of the above
   e) Both A and C

8) When performing a task that requires the use of fall protection equipment, which of the following must be developed prior to the start of work?
   a) A written hazard analysis
   b) A written fall rescue plan
   c) A Human Performance Improvement report
   d) Both A & B

9) Using a ladder next to a guardrail will require the use of fall protection equipment.
   a) True
   b) False

10) Tasks that require cutting, drilling or grinding into concrete must be reviewed by ES&H personnel.
   a) True
   b) False

14 Signature Page and Training Record

"I have read the **SBN-FD Hazard Awareness Training Handout** and understand the hazards present within the facility. Also, I agree to follow all of the listed work rules and emergency procedures."

Print your name: _____Fermilab ID#: _____

Division/Section/Affiliation: _____Department/Group: _____

Fermilab Phone #: _____ Mail Station: _____

Email address: _____

Your signature: _____

Today's Date: _____

If you have not completed this training online, please complete the quiz and this form and return both to:

Angela Aparicio, MS 119

----------FOR ADMINISTRATIVE USE ONLY----------

Course: SBN-FD Hazard Awareness Training (NDSBNFD1/CB/01)

Quiz score: _____/10 (score < 7 = fail)

TRAIN group assignment: _____

Authorization: _____
(Must be signed by ES&H personnel)